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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/593,482

09/20/2006

Hideaki Kume

129189

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25944 7590 07/14/2009

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ALEXANDRIA, VA 22320-4850

EXAMINER

KWON, ASHLEY M

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

07/14/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/593,482	Applicant(s) KUME ET AL.	
	Examiner ASHLEY KWON	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
 4a) Of the above claim(s) 3-6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 7 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/2/08, 9/20/06</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Species III, figure 5, claims 1-2 and 7, in the reply filed on May 27, 2009 is acknowledged. The traversal is on the ground(s) that all species are sufficiently related that a thorough search for any one Group of species would encompass a search for the subject matter of the remaining species. This is not found persuasive because the species lack the same special technical feature, so there would be a serious burden on the Examiner to search and examine all the claims.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

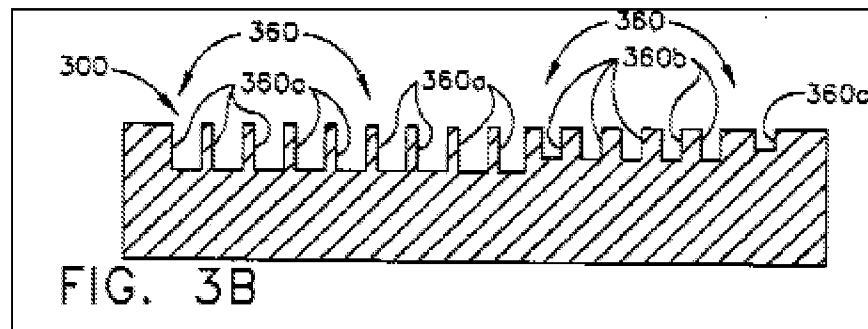
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

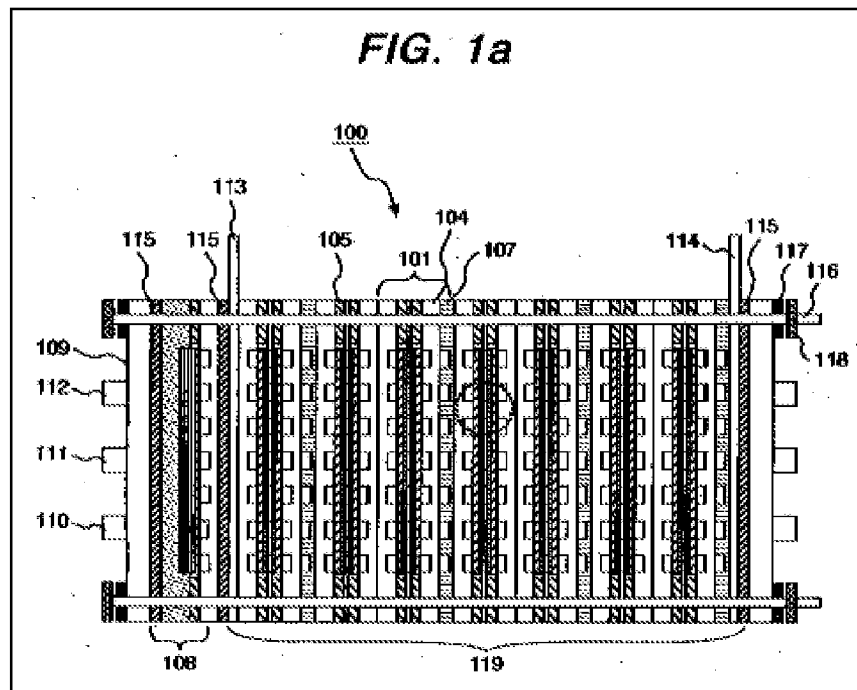
Claims 1, 2, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodcock et al. (US Pat Pub. No. 2004/0265675) (hereinafter "Woodcock") in view of Nishimura et al (US Pat. Pub. 2005/0084731) (hereinafter "Nishimura").

Regarding claim 1, Woodcock discloses a flow field plate (300) for use in a fuel cell, which serve as current collectors in conventional fuel cells (see paragraph 6), comprising a plurality of flow field paths. Each flow field path of the multiple flow field paths has a width, depth, and length such that a flow rate of reactant in each flow field path is proportional to an area serviced by each flow field path so that an electric current density is uniform throughout the flow field plate (see paragraph 19). Therefore, the width, depth, and length of the flow field paths are result effective variables. The discovery of an optimum value of a known result effective variable, without producing any new or unexpected results, is within the ambit of a person of ordinary skill in the art. See *In re Boesch*, 205 USPQ 215 (CCPA 1980) (see MPEP § 2144.05, II.). Woodcock discloses an embodiment in fig. 3b wherein the flow field paths increase in width and depth along the flow field plate, with 360a having the largest width and depth and 360c has the smallest.



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Woodcock fails to explicitly disclose a fuel cell stack comprising a plurality of stacked unit cells; and a collector plate disposed at an end of the stacked unit cells in a stacking direction thereof. However, it would have been obvious that the flow field plate taught by Woodcock could be used in a fuel cell stack and be disposed at the end of the stacked unit cells. For example, Nishimura teaches a fuel cell stack comprising a plurality of stacked unit cells (101); and a collector plate (113, 114) disposed at an end of the stacked unit cells in a stacking direction thereof (see fig. 1a). The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1395 – 97 (2007) (see MPEP § 2143, A.). Therefore, it would have been obvious to a person of ordinary skill in the art to use the flow field plate taught by Woodcock in a fuel cells stack in order to increase the voltage produced by the fuel cells.



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Woodcock also fails to disclose an output terminal for drawing current which is connected to the collector plate. However, Nishimura teaches an output terminal attached to a collector plate (see paragraph 42). The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1395 – 97 (2007) (see MPEP § 2143, A.). Therefore, it would have been obvious to a person of ordinary skill in the art to attach an output terminal to either end of the flow field plate taught by Woodcock in order to be able to connect an external load to take out electric power from the fuel cell stack (*Nishimura*: see paragraph 42). If the output terminal is attached to the end close to 360c (*Woodcock*: see fig. 3b), the output terminal would have a “neighboring region” where the thickness of the flow field plate is thicker than the “other regions”. This would necessarily result in the heat capacity per unit area of the other region to be smaller than in the neighboring region.

Regarding claim 2, Woodcock in view of Nishimura discloses the fuel cells tack according to claim 1, wherein the collector plate is made such that a volume per unit area thereof is different for a neighboring region that is near to a portion where the output terminal is connected as compared to other regions of the collector plate, and the volume per unit area of the other regions is smaller than the volume per unit area of the neighboring region. Volume per unit area is essentially just thickness ($(\text{length} \times \text{width} \times \text{height}) / (\text{length} \times \text{width}) = \text{height}$). By attaching the output terminal taught by Nishimura to the end close to 360c (*Woodcock*: see fig. 3b), the output terminal would have a “neighboring region” where the thickness of the flow field plate is thicker than the “other

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regions”.

Regarding claim 7, Woodcock in view of Nishimura discloses a fuel cell stack according to claim 2, further comprising: an end unit cell including a separator in which gas passages are formed, the separator being integrally formed with the collector plate, wherein at least one of a depth and a width of the gas passages in the other regions of the separator are formed to be larger than a corresponding one of a depth and a width of the gas passages in the neighboring region of the separator. By attaching the output terminal taught by Nishimura to the end close to 360c, the flow field plate would have channels wherein the depth and width are larger in the "other regions" than the "neighboring regions".

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ASHLEY KWON whose telephone number is (571)270-7865. The examiner can normally be reached on Monday to Thursday 7:30 - 6 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AK

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795